

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
4 November 2004 (04.11.2004)

PCT

(10) International Publication Number
WO 2004/095668 A3

(51) International Patent Classification⁷: **H05B 41/16,**
37/02

(US). ZHOU, Jinghai [CN/US]; 1224 University City Blvd., Apt. D-45, Blacksburg, VA 24060 (US). JIANG, Yan [CN/US]; 1210 University City Blvd., Apt. J-114, Blacksburg, VA 24060 (US). OKAWA, Masanao [JP/US]; 51 Cedar Street, Apt. 4301, Woburn, MA 01801 (US). TRAN, Dung, A. [CA/US]; 95 Audubon Road, Wakefield, MA 01880 (US). ERIGUCHI, Hiroyasu [JP/US]; 53 Asbury Street, Lexington, MA 02421 (US).

(21) International Application Number:
PCT/US2004/010963

(74) Agents: BERNSTEIN, Bruce, H. et al.; 1950 Roland Clarke Place, Reston, VA 20191 (US).

(22) International Filing Date: 22 April 2004 (22.04.2004)

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(25) Filing Language: English

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH,

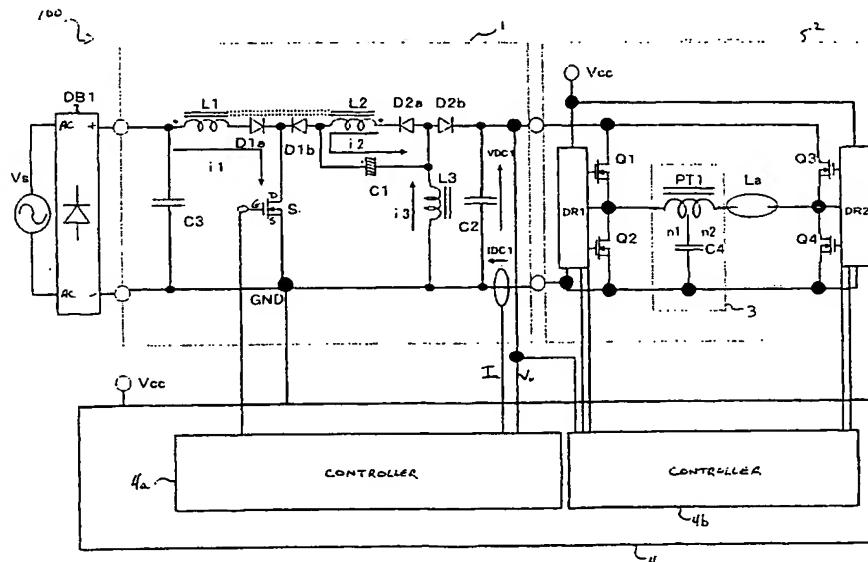
(26) Publication Language: English

(30) Priority Data:
60/464,646 23 April 2003 (23.04.2003) US

(71) Applicants (for all designated States except US): MAT-SUSHITA ELECTRIC WORKS, LTD. [JP/JP]; Intellectual Property Rights Center, 1048, Kadoma, Osaka, Osaka 571-8686 (JP). VIRGINIA TECH INTELLECTUAL PROPERTIES, INC. [US/US]; 1872 Pratt Drive, Suite 1625, Blacksburg, VA 24060 (US).

[Continued on next page]

(54) Title: DISCHARGE LAMP LIGHTING CONTROL DEVICE



(57) Abstract: A discharge lamp lighting control device (100) having a DC power converter, a power factor improving power converter (1), a polarity reversing circuit (2), a starter circuit (3), and a controller (4). The power factor improving power converter 1 includes a switching device S, a power factor improver, and a power converter. The power factor improver operates to smooth a rectified voltage by storing energy in a first inductive device L1 and by discharging energy from a second inductive device L2, in which the first and second inductive devices are magnetically coupled together. The storing and discharging is performed by turning ON and OFF the switching device S. A predetermined DC voltage is converted by energy stored and discharged by a third inductive device L3 in response to the turning ON and OFF of the switching device S.

WO 2004/095668 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/10963

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H05B 41/16, 37/02.
 US CL : 315/209r,215,223,224,242,243,244,246,247,248,291,Dig.5,Dig.7
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 U.S. : 315/209r,215,223,224,242,243,244,246,247,248,291,Dig.5,Dig.7

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,598,326 A (LIU et al) 28 January 1997 (28/01/97), whole document	1-27
A	US 5,907,223 A (GU et al) 25 May 1999 (25/05/99)Figs. 4, 8-10, cols. 3-8.	1-27
A	US 6,034,489 A (WENG) 07 March 2000 (07/03/00), Figs. 2-8, cols. 8-12.	1-27
A	US 6,670,779 B2 (SHEN) 30 December 2003 (30/12/03), Fig. 3, cols.4-6.	1-27

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

12 November 2004 (12.11.2004)

Date of mailing of the international search report

26 JAN 2005

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, Virginia 22313-1450

Faxsimile No. (703) 305-3230

Authorized officer

Trinh Vo Dinh

Telephone No. (571) 272-1821